

© *Telecommunications and Information Highways*

Puerto Rico

1. SYNOPSIS

With one of the most advanced and fastest-growing telecommunications market in the region, Puerto Rico is among the leading countries in Latin America in terms of both fixed-line and wireless penetration. Since the Puerto Rico Telecommunications Act of September 1996, the government-owned Puerto Rico Telephone Company (PRTC) has been privatised and more than 250 telecommunications companies have commenced operations on the island including AT&T, Cingular, Centennial, Sprint and Telefónica de España. Expansion of services and quality of service has improved considerably and competition is fierce. This report provides an overview of the island's telecom sector accompanied by relevant statistics, and brief profiles of the main operators.

2. KEY STATISTICS

Table 1 – Country statistics – 2002

COUNTRY STATISTICS	
Population	3.9 million
Land area	8,959 sq km
Capital	San Juan
Local currency	US dollar
GDP	US\$46.1 billion
GDP real growth rate	-0.2%
Government	Commonwealth

Table 2 – Telephone network statistics – 2001

TELEPHONE NETWORK STATISTICS	
Fixed telephone lines in service	1.329 million
Fixed-line teledensity	33.6%
Major public telecom operators	Puerto Rico Telephone Company (PRTC)

Table 3 – Internet provider statistics – 2002

INTERNET PROVIDER STATISTICS	
Number of ISPs	30+
Major ISPs	<ul style="list-style-type: none"> • PRTC Coqui.Net • AOL Puerto Rico • CaribeNet
Internet host computers	871

Table 4 – Internet user statistics – 2002

INTERNET USER STATISTICS

Internet users	970,000
Internet penetration	24.9%

Table 5 – Mobile statistics – September 2003

MOBILE STATISTICS	
Mobile subscribers	1,598,300
Annual growth	4.2%
Mobile penetration	40.9%
Major mobile operators	<ul style="list-style-type: none"> • CCPR (Cingular Wireless) • Verizon Wireless (PRTC) • Centennial de Puerto Rico • MoviStar • SunCom • Sprint PCS

Table 6 – National telecommunications authorities

NATIONAL TELECOMMUNICATIONS AUTHORITIES	
Regulatory authorities	Puerto Rico Telecommunications Regulatory Board (PRTRB)

(Compiled by Paul Budde Communication Pty Ltd, various industry sources)

3. TELECOMMUNICATIONS MARKET

3.1 OVERVIEW OF PUERTO RICO'S TELECOM MARKET

In 1898, after 400 years of colonial rule that saw the indigenous population nearly exterminated and African slave labour introduced, Puerto Rico was ceded to the US as a result of the Spanish-American War. Puerto Ricans were granted US citizenship in 1917 and two decades later, US President Franklin D Roosevelt launched the Puerto Rican Reconstruction Administration, which provided agricultural development, public works, and electrification of the island. By 1951, Puerto Rico acquired the right to establish a government with its own constitution and in 1952, was declared a semi-autonomous commonwealth territory of the United States.

Puerto Rico is now among the most advanced and fastest growing telecommunications market in the region.

Until 1998, government-owned Puerto Rico Telephone Company (PRTC) was the sole provider of telecom services. Growth in the local market followed approval of the Telecommunications Act of 1996; the Federal Communications Act (FCA) has opened the market up to new levels of competition and created a number of new classes of telecoms operators. As a result, PRTC has been privatised and the island is among the leading countries in Latin America in terms of both fixed-line and wireless penetration. Furthermore, it has one of the highest number of Internet users per capita in Latin America and the Caribbean.

The competitive telecom environment has attracted the likes of AT&T, Cingular, Centennial, Sprint and Telefónica de España, which are offering customers in Puerto Rico an extensive range of products and services at highly attractive rates. With more than 250 telecommunications companies operating on the island, expansion of services and quality of service has improved considerably and competition is fierce. However, consolidation in the industry is inevitable over the coming years.

The mobile market has seen the fastest growth in the number of subscribers as well as the number of companies entering the local market. Wireless services are provided by six carriers: Centennial de Puerto Rico, Cingular, MoviStar, SunCom, Verizon and most recently, Sprint PCS. Wireless Personal Communication System (PCS) is available using the latest digital protocols, including Code Division Multiple Access (CDMA), GSM, and Time Division Multiple Access (TDMA).

Centennial is the only wireless operator that also offers fixed-line services. Although PRT has a 93% share of the local market, its dominion is being increasingly challenged by Centennial, which already virtually controls the remaining 7%.

4. REGULATORY ENVIRONMENT

4.1 BACKGROUND

The history of telecommunications in Puerto Rico is tied to the United States. The telecom market had been a monopoly situation until the landmark passage of the Federal Telecommunications Act of 1996. Under the new law, Incumbent Local Exchange Carriers (ILECS) had to allow rivals to interconnect with its network elements on an unbundled basis and at advantageous cost based rates. ILECS were also required to facilitate market entry by new Competitive Local Exchange Carriers (CLEC).

In Puerto Rico, intra-island monopoly persisted and the government was forced to create a specialised body to carry out local aspects of the Act. This saw the introduction of the Puerto Rico Telecommunications Act of 1996 (Law 213 of September 1996) and the creation of the Puerto Rico Telecommunications Regulatory Board (PRTRB) as the industry regulator. The board was established to foster total, equal and fair competition which led to the incumbent operator, PRTC, facing competition for the first time.

The Law required PRTC to make its network available to other carriers. It also required PRTC to maintain a fair competitive environment in which access is provided under the same conditions that PRTC makes it available to its own affiliates, and that these fees be based on actual costs.

4.2 REGULATORY AUTHORITY

4.2.1 Puerto Rico Telecommunications Regulatory Board

Requirements of the PRTRB are to:

- ensure availability of universal telecommunications services at affordable rates for all citizens of Puerto Rico;
- oversee the efficiency of telephone service and cable TV, as well as other telecommunication services;
- assure the continuity in the rendering of services of a social nature, such as public telephones, according to the public need;
- promote competition;
- guarantee Puerto Ricans the same telecommunications and information privileges enjoyed by other US citizens;
- safeguard the public interest to the utmost.

4.2.2 Universal service fund

Pursuant to Law 213, the legislature required the PRTRB to guarantee all citizens of the island telecommunications service at a fair, reasonable and affordable price. In order to achieve this goal, the PRTRB has established the Puerto Rico Universal Service Fund (PRUSF). The fund is to be used to subsidise telecom services on the island and the PRTRB ordered that Lifeline Assistance and Telecommunications Relay Service (TRS) be funded. Assessments to recover TRS funding began in July 2001 and increased assessments to fund Lifeline Assistance commenced effective January 1, 2002.

In accordance with Law 213, every telecommunications company that provides intra-island telecom services in Puerto Rico shall contribute to the fund in an equitable, non-discriminatory and competitively neutral manner.

The PRUSF is administrated by the National Exchange Carrier Association Inc (NECA), which will perform all of the PRUSF implementation, management and administration functions.

4.2.3 Regulatory issues

In April 2002, following years of regulatory discussions, AT&T Corp, Sprint Corp and Telefónica SA filed suit in a Puerto Rican court seeking the reimbursement of US\$1.15 billion in alleged overcharges of intra-island access charges levied on long-distance carriers and customers by PRT.

The regulatory authority concluded that the per call access fee charged by PRT was not cost-based and therefore illegal. The companies pay US\$0.9 per minute for using PRT's local loop to provide intra-island long-distance service.

4.3 NUMBER PORTABILITY

The 1996 Federal Telecommunications Act ordered the implementation of Local Number Portability (LNP) by all incumbent telephone companies including PRT.

LNP has three variants: fixed to fixed-line portability, Wireless to Wireless Portability (WLNP), and fixed-line to Wireless Portability (intermodal LNP).

The US Federal Communications Commission (FCC) established a deadline of November 24, 2003 for the implementation of wireless and intermodal LNP. Fixed to fixed-line LNP became effective in July 2003.

4.4 PRIVATISATION OF PRTC

In February 1999, the FCC approved the privatisation of PRTC to the GTE consortium (US) for just over US\$2 billion. GTE merged with Bell Atlantic in July 1999. Under the privatisation agreement backed by the Puerto Rican legislature, Verizon led the group of private investors with 40% of the holdings.

When TELPRI, the holding company of PRTC and Verizon Wireless de Puerto Rico, was privatised in 1999, Verizon and Popular were granted the option to acquire an additional 15% of TELPRI stock at any time during the three years following the close of the sale. In April 2002 this option was taken up and Verizon acquired an additional 12% equity interest in TELPRI, and Popular acquired an additional 3%. Verizon now holds 52% of the company.

PRTC is one of Puerto Ricos most prosperous companies and the process of privatisation was violently opposed. Demonstrations including bombings and slashed telephone lines were only the beginning of protests against the privatisation process. Trade unions in Puerto Rico, a territory dependent on the US, withdrew at least US\$140 million from local bank Banco Popular, which participated in the PRTC sale consortium.

5. FIXED NETWORK OPERATORS IN PUERTO RICO

5.1 INTRODUCTION

The Telecommunications Act of 1996 requires incumbent phone companies (ILECs) to allow their competitors access to their infrastructure using fair rates based on their costs. The fundamental purpose of the Act is to avoid ILECs from using the existing infrastructure to force subscribers to purchase all services from them, even when a competitor can offer better and more economical alternatives.

The local call market is dominated by PRT. In mid-2001 International Telecom Ltd (ITL) ceased operations in Puerto Rico leaving PRT with its local telephone service monopoly intact. ITL was among the first independent phone companies certified in Puerto Rico in 1999. It is a CLEC and as such was one of the few competitors to PRT. The company claimed it was no longer able to operate because of the roadblocks to competition placed by PRTC.

Centennial de Puerto Rico is now PRT's main competitor, claiming around 7% of the local market (see chapter 5.3).

Cable TV operator, Liberty Cablevisión, is investing US\$22 million to offer basic service using VoIP technology. It provides local telephony service in the towns of Fajardo, Rio Grande and Luquillo and plans to launch in other areas during 2004. The company launched a joint plan with Net2Phone and captured 1,000 customers in four weeks. The network has capacity for 290,000 lines.

Although new companies will be able to expand the market, PRT's disproportionate control of local lines is not expected to change significantly in the near future.

The local long-distance call market is extremely competitive. The Telecommunications Act has had a great impact on long-distance services in Puerto Rico. Prior to 1996, subscribers were forced to pay the long-distance rates established by PRT and to accept the levels of service it offered, resulting in many cases in higher costs and mediocre service. Today subscribers are free to change to the provider that offers a better service or a lower price. There is no obligation to use the local phone company. There is no doubt that the low long-distance call rates are a result of the competition in that market.

'Rate integration' requirement of the Act says that a long-distance carrier serving an offshore point must employ the same rate structure it uses for its mainland services. The rate integration requirement is vitally important to Puerto Rico. Due to rate integration, it is cheaper to call mainland US than to call across the island. Without rate integration, rates for long-distance service could increase substantially, and the well-being of Puerto Rico as well as many other states and territories would be diminished.

5.2 TELECOMUNICACIONES DE PUERTO RICO INC (TELPRI)

Headquartered in San Juan, Puerto Rico Telephone (PRT) is the largest provider of telecommunications services in Puerto Rico and is the principal subsidiary of Telecomunicaciones de Puerto Rico Inc (TELPRI). PRT provides wireline, wireless, long-distance, paging, Internet and telephone services to both business and residential customers. Verizon owns a 52% of TELPRI, which owns PRT and its wireless company, Verizon Wireless Puerto Rico Inc. Verizon operates Verizon Wireless, the largest wireless communications provider in the US. Although the two wireless companies have similar names, they are separate entities.

PRT's range of services include enhanced wireline, cellular, paging, fibre optic, videoconferencing and Integrated Services Digital Network (ISDN), intra-island and off-island long-distance service and public payphones. The company has experienced tremendous growth in wireless, data, prepaid and enhanced services, offering high-speed technology such as Internet, T-1 lines and 56Kb/s.

Under private ownership of International Telephone and Telegraph (ITT) until 1974, PRTC was the largest telephone service provider on the island when the government bought the company and turned it into a public corporation. At the time of the purchase, PRTC's technology was outdated, and only an estimated 200,000 residents had telephones.

In 1999 the company was required to split into two separate wholly-owned operating subsidiaries. The paging and cellular operations became a separate subsidiary from the rest of its operations.

PRT has pledged to invest US\$160 million in 2004 on infrastructure and operational improvements, bringing the total new investment to around US\$1.4 billion since it was privatised.

In February 2004, the company began converting the island's 68 local calling zones into 10 regional zones, part of a federal legal settlement concerning long-distance access rates for carriers. This will result in lower tariffs on some intra-island phone calls.

For more information, see separate report: [Verizon Communications](#).

5.3 CENTENNIAL DE PUERTO RICO (CPR)

CPR is a wholly-owned subsidiary of US company Centennial Communications Corporation, formerly known as Centennial Cellular Corporation. In the Caribbean, Centennial is a facilities based, fully-integrated communications service provider offering wireless and broadband voice, data, Internet and cable TV services to business and residential customers.

In May 2000, Centennial Communications purchased the assets of cable television systems from Pegasus Communications Corporation and the company is now known as Centennial Cable TV. The cable systems pass over 170,000 homes in western Puerto Rico and serve over 55,000 subscribers using fibre optic and coaxial cable. This acquisition added cable television to Centennial's current Puerto Rico service offerings of wireless PCS, Wireless Local Loop (WLL), Internet, local and long-distance telephone services.

CPR is a full telecommunications provider with a 30MHz licence for all Puerto Rico and the US Virgin Islands and a CLEC licence for Puerto Rico. It was authorised to provide intra-island and interstate switched service, becoming a competitive access provider in December 1994. The operator provides full fixed-line telecom services to new housing developments and commercial buildings around the island. Its share of the local market is around 7%.

In August 1999 CPR acquired Integrated Systems and Spiderlink Internet Services. Integrated Systems became Centennial Data Services while Spiderlink merged into Centennial Internet Services.

5.3.1 Centennial Broadband

CPR's Broadband Services Division launched its all IP-over-fibre networks in August 2001, which allows the delivery of Internet access to businesses at speeds up to 1Gb/s. The network uses IP and native Ethernet protocols, eliminating the need for ISDN, frame relay, ATM, SONET or other legacy protocols. Centennial Broadband has

significantly increased its capacity in submarine fibre optic cables around the world and established a gateway switch in Florida, as well as presence in the Network Access Point (NAP) of the Americas, to provide direct connectivity to Puerto Rico with the United States and the rest of the world.

Innova, the first broadband product, bundles regular voice and high-speed Internet/data services into a single package for business customers.

5.4 TELEFÓNICA LARGA DISTANCIA DE PUERTO RICO (TDL)

TLD is an affiliate of Telefónica de España. Its entry into the PCS services market and decision to participate in the intra-island telephone market, was made possible by the elimination of the 'no competition' clause between TLD and the Puerto Rico Telephone Authority in August 1998. Following approval by the FCC, the purchase by Telefónica of 79% TLD was completed in 1992. In 2000, Telefonica Móviles unsuccessfully sought to gain control of Telefónica de Puerto Rico.

TLD operates domestic and international long-distance services, and since early 1999 it has provided a long-distance national intra-island service. PCS services are offered under the brand name MoviStar, which is managed by Telefonica Móviles.

In early 2004, TLD and Telefónica affiliate TData Puerto Rico, announced plans to converge their local, long-distance and data services onto a next generation Voice over Internet Protocol (VoIP) network, allowing rapid delivery of advanced IP services to businesses and consumers in Puerto Rico.

The deployment of Nortel Networks' converged solution will increase network capacity, enabling more rapid delivery of new, bandwidth-intensive services. It will also position TData and TLD to drive reduced operating costs, and to evolve their network to support future roll-out of multimedia services like video calling, unified messaging, and remote collaboration.

Besides offering IP-centric business applications to corporate customers, TData will also resell and deploy Nortel Networks IP solutions.

For more information, see separate reports:

- [Telefonica SA](#);
- [Telefonica Latinoamerica SA](#).

5.5 AT&T PUERTO RICO

AT&T has offices in some 16 different countries across the Caribbean and Latin America region and has partnership arrangements in Brazil, Chile, Colombia, Mexico, and Venezuela. The Caribbean and Latin America region has become one of AT&T's fastest growing areas, contributing more than 20% of AT&T's revenues from outside the United States.

AT&T Puerto Rico offers a variety of long-distance services, both international and intra-island, to individuals and businesses. It also supplies AT&T Accunet Switched 56 Service, a digital service offered to businesses for the transmission of data with a bandwidth of 56Kb/s. This service enables:

- video teleconference;
- high-speed faxes;
- data transfer;
- data transferring from PC to PC;
- contingency system and emergency restoration.

The company also offers Internet services via AT&T WorldNet Service.

For more information, see separate report: [AT&T Corporation](#).

6. TELECOMMUNICATIONS INFRASTRUCTURE

6.1 NATIONAL TELECOM NETWORK

Puerto Rico's telecom infrastructure is comparatively advanced, with a 100% digital network. The telephone system allows instant access to mainland US and international markets via high-speed third generation technologies. Between 1999 and 2003, over US\$1 billion had been invested in upgrading and expanding PRT's network.

Approximately 93% of the island's fixed lines are provided by PRT.

Table 7 – Fixed lines in service – 1996 - 2001

Year	Fixed lines	Teledensity
1996	1,254,000	33.1%
1997	1,322,000	34.6%
1998	1,262,000	32.7%
1999	1,295,000	33.3%
2000	1,299,300	33.2%
2001	1,329,500	33.6%

(Source: Paul Budde Communication based on ITU data)

The backbone of PRT's network is over 4,600km of fibre optic cable, creating 12 self healing rings that cover the island from coast to coast. A recent implementation has been the Asynchronous Transfer Mode (ATM) network, which allows for faster, more efficient and effective transmission of data, voice and video, plus Internet access from all points within the island. This network rivals and even exceeds in quality many of the ATM networks in mainland US. It is the backbone of the EduNet System, which is taking the Internet to approximately 1,500 schools in Puerto Rico.

In addition, Centennial offers some 800km of fibre optics, concentrated primarily in the San Juan metropolitan area. Other telcos also have multi-million dollar plans to expand and improve their operations and services.

6.1.1 State-wide broadband network – PRStar.Net

The PRStar.Net project, developed by Puerto Rico's Office of Management and Budget, is a high-speed telecom network comprising fixed and wireless connections throughout the island. PRStar.Net's operational centre in Santurce connects all state facilities and jurisdictions in 79 municipalities – 785 central government offices, 332 public housing projects, and over 2,500 public schools.

In addition to regular state government offices, city halls, the legislature, public schools, public housing projects, courts, correctional facilities, and public libraries, receive telecom services off the PRStar.Net free of charge.

One of the largest private broadband wireless networks ever installed, the network infrastructure brings the island many benefits including financial savings, increased production, a cleaner environment, improved education for children and labour force, and increased public service and security.

PRStar.Net was designed from the early stages with ATM technology; it transmits information either through cable or high-speed wireless systems. The network infrastructure supports all forms of communications including voice, data, e-mail, video, Internet and multimedia, using as a standard the protocol Transmission Control Protocol/Internet Protocol (TCP/IP) that is used worldwide via the Internet.

6.2 INTERNATIONAL INFRASTRUCTURE

The island is linked to the US, Europe, South America and the Caribbean by an extensive satellite network and six major submarine cables including Americas, Arcos, Florico II/TCSI, Taino, Antillas and SAM USA.

7. INTERNET

7.1 OVERVIEW OF THE INTERNET IN PUERTO RICO

Puerto Rico has one of the highest number of Internet users per capita in Latin America and the Caribbean. By early 2003, around a quarter of the population had access to the Internet, including most sectors of society. The number of Internet users has been given a boost with heavy promotions by Internet Service Providers (ISPs) and computer manufacturers.

The island's modern telecom infrastructure allows users to select from a range of Internet access technologies, including wireless, Digital Subscriber Line (DSL) and cable modems; however, dial-up connection still accounts for the majority of Internet connections. Wireless point-to-point is now available with OC-3 (155Mb/s) connections. ISDN connections are waning.

7.1.1 Internet statistics

With an average of 3.4 users per paid subscription account, the total number of Internet users on the island approached one million in early 2003, of which around 794,000 were residential users.

Table 8 – Internet users – 1996 - 2002

Year	Users
1996	10,000
1998	100,000
1999	450,000
2000	551,000
2001	780,000
2002	970,000

(Source: Paul Budde Communication based on ITU and ISPR data)

Note: Internet users are those accessing the Internet from school, university or work, as well as from individual household or business accounts. Subscribers are individuals who pay for Internet access accounts.

Table 9 – Internet host computers – 1994 - 2002

Year	Hosts
1994	82
1995	82
1996	82
1997	260
1998	1,571
1999	1,310
2000	1,513
2001	1,584
2002	871

(Source: ITU reports)

Note: A host is a domain name that has an IP address record associated with it. This would be any computer system connected to the Internet via full or part-time, direct or dial-up connections.

7.2 PROFILE OF INTERNET USERS

Research & Research, in collaboration with Nobox Marketing Group for the Puerto Rico chapter of the Internet Society (ISPR), published a study in April 2003 that revealed the following data:

- The average age of Internet users in Puerto Rico decreased from 32 in 1997 to 24 in 2002 prompting a change in the types of services that will be offered to users. Basically, this younger audience will demand faster, mobile high-tech options, eg they want better and cheaper access to chat and e-mail services. It is likely that this segment will continue to drive the market as it matures.

- The gender gap is closing. By end-2002, 51% of the users were men and 49% were female, compared with 68% and 32% respectively in 1997.
- While earlier reports showed that the San Juan metro area had the highest concentration of Internet users, now 61% are outside that area. With that has come a change along socio-economic lines. In 1997, 84% of Internet users belonged to the middle- and high-income classes while 16% belonged to lower-income groups. In 2002, 58% of users belonged to the former group while 42% are considered to be in the low-income segment.
- Some 80% of individuals preferred to use the Internet at home, while 12% did so from their workplace, 7% from school, and 1% from a friend's house or elsewhere.
- The average Internet user spends about 14 hours a week online, most of that time using search engines (mainly Yahoo and Google). In fact, 64% of those surveyed claimed they use the Internet to find information, while 36% of the respondents mainly use it for e-mail. Only 25% of survey participants said they used online banking services. Most respondents also expressed a need for better and more e-government services; in fact, 60% of users over age 35 demanded it.
- Nearly half of those surveyed (47%) said they made at least one purchase over the Internet in the 12 months before the data was compiled, with most of them buying an average of five items during that time. The most popular items were entertainment (57% of respondents), clothes and other apparel (29%), and computers and electronics (25%).
- While most locals would not object to shopping over the Internet, many have no credit cards or other banking relationship, making it difficult for e-commerce to take off.

7.3 ISP MARKET

Access to the Internet is provided by more than 30 ISPs but the market is dominated by three players: PRTC Coqui.Net with around 53% market share, AOL with about 16% and CaribeNet with 11%.

Other ISPs include:

- | | | |
|-------------------------|----------------------|--------------------------------|
| • Alliance Networks; | • Interweb; | • Sprint International Caribe; |
| • AT&T of Puerto Rico; | • Islanet; | • TainoNet; |
| • Ayustar; | • MCI International; | • TLD.Net; |
| • Caribbean Internet; | • Mobile Universe; | • Internet World Connection; |
| • Centennial Broadband; | • PR Digital; | • Uno RedNet; |
| • Eastern Net; | • PRC Internet; | • WorldNet Solutions. |
| • Edupro Net; | • PRT Internet; | |
| • IceNetworks; | • PRW Net; | |

Higher bandwidth is a determining factor in selection of an ISP and with cable, DSL or T1 connections now available many users are switching from dial-up ISPs.

A number of ISPs now included Internet access and telephone service on a single account.

7.3.1 CaribeNet

Founded in 1994, CaribeNet was Puerto Rico's first ISP to implement dial-up Internet access for residential users. Operating one of the largest, most advanced Internet access networks in the Caribbean, it offers a range of solutions for businesses, government, educational institutions and consumers. These include dial-up, dedicated and wireless Internet access and a high-speed broadband solution for the hotel industry.

7.3.2 Islanet Communications

Founded in 1997, Islanet is based in San Juan with local access to more than 60 cities and an island-wide frame relay and ATM network. Operating as a full telecommunications provider, it was certified as the second facilities-based CLEC in Puerto Rico and the only wireless CLEC on the island.

The company offers wireless high-speed access to the Internet and intranets, VoIP services, DSL, Frame Relay and ATM connectivity, Virtual Private Network (VPN), Web design and hosting and applications management and hosting for companies.

7.3.3 PRTC Coqui.Net

Launched in 1995, Coqui.net/Prtc.net is the dominant provider of ISP services for residential and business customers in Puerto Rico. It provides dial-up access, DSL, ISDN and Web hosting. Dedicated access service is provided by sister company PRT.

8. BROADBAND MARKET

8.1 OVERVIEW

High-speed Internet services are available in Puerto Rico through cable modem, wireless, Asymmetric Digital Subscriber line (ADSL) and cable television. However, the island's broadband market has not followed the growth trends seen in the long-distance and cellular markets. Less than 6% of all local connections to the Internet could be considered broadband, about a third of the level in the United States. Currently there is no governmental commitment in this area and no incentives for better facilities or free competition among providers. There are over 250,000 Internet connections on the island at speeds of 56Kb/s or less.

Since 80% of households in Puerto Rico have a telephone line and less than 30% have cable and satellite TV, DSL connections are more readily available to more people than cable access. Also, depending on the provider, DSL can deliver connection speeds twice, and even three times as fast as cable modems. Moreover, cable is

historically known for being adversely affected by foul weather conditions, and it offers a shared broadband connection, meaning that the entire neighbourhood may be accessing the Web over a common line. By contrast, DSL is a dedicated service, whereby the information is sent over the line going out of the customer's house directly to the server it is intended to reach.

8.2 ADSL

ADSL is provided through the current copper wire telephone network, so PRT provides the service to the majority of telephone clients. This means that other companies in Puerto Rico cannot offer higher speeds or lower prices in ADSL using the existing wiring. Centennial is only able to offer DSL service in places where it is the sole provider of telecom services.

The availability of broadband connections at low prices is important in the development of Puerto Rico. By restricting freedom of choice, PRT is limiting the growth of the market and prevents the island from reaching a leadership position.

8.3 CABLE MODEMS

Internet access through cable television uses the coaxial cable entering homes to transmit and receive large amounts of data at high-speed. The following companies provide cable modem services in Puerto Rico:

- Adelphia
- Centennial Cable TV
- Liberty Cablevisión
- PRWEBTV

Serving 30 towns in the southwest, Centennial Cable TV claimed 1,000 subscribers to its SpeedBox cable modem service in February 2003. It offers two service packages: one offers downloads at 128Kb/s and 64Kb/s uploads, while the other offers 512Kb/s downloads and 128Kb/s uploads.

Liberty Cablevisión was providing Internet access to 10,000 subscribers in 17 towns by early 2004, with plans to cover a further 10 towns before mid-year.

8.4 WIRELESS BROADBAND

8.4.1 Wireless ISPs

Companies offering a range of wireless broadband services include:

- Acelera Networks – 3.5GHz Local Multipoint Distribution Systems (LMDS) broadband wireless access;
- AeroNet Wireless PR – 2.4GHz frequency;
- Ayustar – redundant access to the Internet backbone through AT&T and Sprint;
- Eastern Net – service requires a dedicated local loop connection provided by Centennial de Puerto Rico or PRT. Eastern Net also offers wireless microwave connections;

- IceNetworks – Internet via satellite;
- Islanet Communications – 2.4GHz frequency (see chapter 8.4.2);
- NeptunoNetworks – fixed broadband wireless access for Internet, data, multimedia, video, voice, and other emerging IP and ATM based applications. Point-to-point and point-to-multipoint, VoIP;
- MegaNetPR;
- Mobile Universe –mobile and wireless networking solutions and technology for Internet access via satellite at home, business, and on the road;
- QwikWire.Net – wireless broadband and Wi-Fi services (802.11b compatible) to tenants, customers and end users in planned communities, office parks, resorts, timeshares, marinas, etc

8.4.2 Wireless Local Loop (WLL)

Islanet Communications offers ‘last mile’ solutions using the WIMAN II Series high-performance, high-speed WLL network, which provides dedicated wireless Internet and intranet access with raw data rate speeds of 2Mb/s. The system is designed for flexible spectrum usage, operating in various frequency ranges, depending on the needs of the service provider. The 2.4GHz system used by Islanet operates in the ISM band, which is a non-regulated, public access range in many countries.

The product provides commercial-grade wireless broadband transmission over extended ranges of up to 32km. Islanet has a network of more than 60 PoPs throughout Puerto Rico through which it can run data, voice, video, and high-speed Internet.

8.4.3 Internet via satellite

US-based StarBand launched high-speed two-way broadband satellite service in Puerto Rico in mid-2002. For residential customers it offers always on connectivity at up to 10 times faster download speeds than dial-up. Other products include the Telecommuter service for people working from home, and the Small Office service, which provide speeds up to 20 faster than dial-up.

In addition to Puerto Rico, StarBand provides its Internet services to customers in all 50 US states and the US Virgin Islands. StarBand partners include Gilat Satellite Networks, Microsoft Corporation and Echostar Communications.

In Puerto Rico, the service can only be purchased through one of StarBand’s local authorised partners such as Mobile Universe.

9. CONTENT AND E-SERVICES

9.1 E-COMMERCE

At least 10% of local Internet users engage in e-commerce, with e-shopping and business applications the most popular. Internet users have a very high willingness to conduct cross-border commerce online. The world average is 52% while in Puerto Rico the average is 75%.

Banco Bilbao Vizcaya Argentaria and Movistar have launched BBVA Movil, a service that allows users to make bank transactions and to obtain information on their accounts through their cellular telephones, provided with WAP technology.

According to a study conducted by Research & Research, the value of Puerto Rico's e-commerce market increased from US\$31 million in 1999 to US\$245 million at end-2002.

Over 60% of Puerto Ricans go online every day and around 47% have bought goods online.

9.1.1 E-commerce strategy

PRStar.Net (see chapter 6.1.1) is a fundamental element in the government's e-commerce strategy. This initiative addresses that need by stimulating advances in the public communications network that are needed for e-business to continue flourishing in Puerto Rico.

PRStar.Net hosts a governmental portal, linking agency Websites providing online services, such as permits, employment information, statistics and income tax forms.

Communities in the process of development and of moderate economic resources are able to rely on Internet access through PRStar.Net to make electronic transactions and have communication with the rest of the world in a global environment where barriers of any social class do not exist. PRStar.Net is designed to reduce the digital divide and increment access opportunities in Puerto Rico remote communities.

The enactment of the Digital Signature Act in 1998 gives electronic signatures the same legal standing as a handwritten signature on paper – another government initiative to develop growth of e-commerce in Puerto Rico.

10. WIRELESS COMMUNICATIONS

10.1 OVERVIEW OF PUERTO RICO'S MOBILE MARKET

PRT's Celulares Telefónica (Now Verizon Wireless) and Cellular One (now Cingular Wireless) pioneered mobile communications on the island, both launching their analogue networks in 1986 and 1988 respectively. At the time, cellular service was limited, equipment was cumbersome and the costs to consumers were high. Then in Movistar entered the market at the end of 1999 offering free incoming calls. This

created a complete revolution and forced other players to act accordingly, with additional offers. By 2001 six companies were providing island-wide mobile services and costs have fallen so dramatically that today, almost anyone can afford a mobile phone. Consequently, mobile penetration in Puerto Rico approached 40% in early 2003 – one of the highest penetration rates in the region – and is expected to pass 50% during 2004.

From a regulatory aspect, the local wireless market has grown into a healthy industry with broad choices for consumers resulting in highly competitive rates as carriers strive to increase their market share. Some examples include free incoming calls, free calls at night or weekends, and large minute-bundles on almost every plan.

The two leading mobile operators are Cingular Wireless and Verizon Wireless, which together have roughly 60% of the market. The smaller operators are Centennial de Puerto Rico, Movistar, SunCom and the most recent entrant, Sprint PCS. All carriers offer digital quality via a network that uses either CDMA or TDMA technology. Apart from similar transmission technologies, they operate in either the 800MHz band (cellular) or the 1900MHz band (PCS) of the radio frequency spectrum.

The launch of Third generation (3G) networks by the operators has enabled customers to take advantage of next-generation features such as mobile, wireless Internet and high-speed data services (see chapter 10.4).

Puerto Rico introduced wireless number portability at the same time it was launched in the USA, November 2003.

10.1.1 Mobile statistics

Table 10 – Mobile subscribers by operator – September 2003

Operator	System	Launch	Subscribers	Annual growth
Verizon Wireless (PRTC)	AMPS	1986	3,000	-90.9%
	TDMA/CDMA	2001	351,000	14.7%
CCPR (Cingular Wireless)	AMPS	1988	0	-100.0%
	TDMA/GSM-1900	1997	604,000	4.1%
Centennial	CDMA-1900	1996	236,200	6.4%
Movistar	CDMA-1900	1999	175,100	0.7%
AT&T/SunCom	TDMA-1900	1999	173,000	5.5%
Sprint PCS	CDMA-1900	2001	46,000	12.3%
Total			1,598,300	4.2%

(Source: Global Mobile)

Table 11 – Operators market share – 2002 - 2003

Company	2002	2003
Cingular	39%	38%
Verizon	20%	22%

Centennial	15%	15%
MoviStar	12%	11%
AT&T	11%	11%
Sprint PCS	3%	3%

(Source: Global Mobile)

Table 12 – Mobile subscribers – 1996 - 2003

Year	Subscribers
1996	329,000
1997	367,000
1998	580,000
1999	814,000
2000	1,152,000
2001	1,508,000
2002	1,549,600
2003 (Sept)	1,598,300

(Source: ITU reports and Global Mobile data)

10.2 MAJOR MOBILE OPERATORS

10.2.1 AT&T Wireless (SunCom)

AT&T Wireless completed its acquisition of TeleCorp PCS in February 2002. TeleCorp PCS has offered its SunCom digital wireless services on the island since 1999. In August 2002 AT&T Wireless replaced its affiliate, SunCom, and immediately established its mLife menu of features and services.

TeleCorp began deploying a General Packet Radio Services (GPRS) data network in 2001 as an overlay onto its existing TDMA network in Puerto Rico. GPRS allows TeleCorp to accommodate GSM voice traffic, thus giving the ability to collect new inbound roaming revenue from US and international GSM subscribers.

Network coverage extends to 78 towns in Puerto Rico and the US Virgin Islands.

For more information, see separate report: [*AT&T Wireless Services Inc.*](#)

10.2.2 Centennial de Puerto Rico

Centennial (CPR) deployed the country's first CDMA network in December 1996. In April 2002, the operator migrated from its existing cdmaOne system and launched 3G services, based on CDMA2000 1X technology. The new TurboNet service provides the capacity to transmit data, in the form of text, images and video at speeds up to 144Kb/s, ten times the speed commonly available with first generation CDMA networks.

10.2.3 CCPR (Cingular Wireless)

In 1999 Cellular Communications of Puerto Rico (CCPR) was acquired 50:50 by Teléfonos de México (Telmex) and SBC Communications. In 2000, SBC and BellSouth Corporation combined their US wireless operations to form a new company, Cingular Wireless. America Movil was spun off from Telmex in September 2000, and in January 2002 sold its 50% stake in CCPR to SBC International. CCPR operates under the Cingular Wireless brand name.

Cingular Wireless is the second largest wireless company in the US, providing mobile voice and data communications. A joint venture between the domestic wireless divisions of SBC (60%) and BellSouth (40%), provides cellular/PCS service in 43 of the top 50 US markets and provides corporate e-mail and other advanced data services through its GPRS, EDGE and Mobitex packet data networks. At the beginning of 2003, Cingular committed to rapid conversion of its network to GSM/GPRS.

CCPR launched its AMPS network in 1988 and a TDMA/GSM-1900 system in 1997. It has grown to become the leading mobile operator in Puerto Rico with approximately 40% market share.

For more information, see separate reports:

- [SBC Communications \(Archived\)](#);
- [Cingular Wireless](#);
- [America Movil](#).

10.2.4 MoviStar Puerto Rico

MoviStar Puerto Rico is the result of a joint venture formed in 1999 between of Telefónica Larga Distancia de Puerto Rico (TLD), an indirect subsidiary of Telefónica, and ClearComm LP, forming NewComm Wireless Services Inc. Under the terms of the agreement, ClearComm assigned its licences to NewComm and TLD agreed to provide the necessary capital to launch PCS services in Puerto Rico. NewComm holds two PCS and 131 fixed microwave services licences, and is authorised to provide international global resale and facilities-based telecommunications services.

Operating under the brand name MoviStar, its PCS services are offered on an island-wide CDMA network. MoviStar is managed by Telefónica Móviles (49.9%), a publicly-traded Spanish corporation controlled by Telefónica SA. Telefónica Móviles is the leading wireless operator in the Spanish and Portuguese speaking market and over 46 million customers worldwide.

MoviStar offers a range of MoviPlan products and the prepaid service Oye, for which all incoming calls are charged at half price. Services include e-moción, Telefónica Móviles' mobile Internet access platform, SMS, location-based services and the first rechargeable card kit in Puerto Rico. Internet access allows its clients access to news, stock markets and to send and receive e-mails through WAP-enabled phones.

In August 2003, MoviStar contracted TeleCommunication Systems Inc to provide E911 Phase II location-based services.

Table 13 – Movistar subscribers – 2000 - 2003

Year	Subscribers
2000	149,300
2001	186,100
2002	169,000
2003 (June)	179,900

(Source: Global Mobile and company data)

For more information, see separate report: [Telefonica SA](#).

10.2.5 Sprint PCS

In 1998, Sprint split its operations into two groups, the FON Group and the PCS Group. The PCS Group comprises a 100% digital personal communications service wireless network, with PCS licences to provide service to the entire US population, including Puerto Rico and the US Virgin Islands.

Sprint launched its wireless services in Puerto Rico in September 2001. Sprint PCS has invested more than US\$200 million in building out its all-digital, all-PCS network on the island, with advanced equipment from Samsung Telecommunications and Nortel Networks. Based on CDMA technology, the network is an extension of the company's network in the United States and has the same capabilities and services including 3G service.

Sprint launched nationwide 3G capability in 2002, providing enhanced data services. Marketed as PCS Vision, the service allows use of Vision-enabled PCS devices to check personal and corporate e-mail, take and receive pictures, play games with full-colour graphics and polyphonic sounds and browse the Internet wirelessly with speeds up to 144Kb/s (with average speeds of 50 to 70Kb/s). The Sprint PCS Wireless Web service offers wireless Internet access and content through partners such as America Online, Hoover's, and eBay.

For more information, see separate report: [Sprint Corporation](#).

10.2.6 Verizon Wireless Puerto Rico (PRTC)

Celulares Telefónica Inc is the wireless arm of PRTC in which Verizon holds majority ownership. Verizon Wireless, the leading provider of wireless communications in the United States, is a joint venture of Verizon Communications and Vodafone. Verizon Wireless Puerto Rico is the second largest mobile operator on the island, with around 22% market share.

The commercial launch of Verizon Wireless Express Network, a CDMA2000 1X voice and high-speed data network was in February 2003. The CDMA2000 1X enhancements can double the voice capacity of Verizon's CDMA network and

increase data-transmission speeds by nearly 10 times, without the need for additional spectrum.

In early 2004, the operator announced that it would invest US\$25 million to switch on new transmission sites and cover 95-97% of the island's population.

For more information, see separate report: [Verizon Communications](#).

10.3 MOBILE VOICE SERVICES

10.3.1 Prepaid cards

Generating over US\$10 million a year, prepaid services have proved more popular in Puerto Rico than on the US mainland. However, the prepaid segment has not grown as rapidly as anticipated and currently represents less than 50% of the local market.

Verizon's prepaid Aactiva Mas+ card can be used to recharge a cellular phone or to make long-distance calls.

10.3.2 Satellite mobile

Vodafone Group Plc subsidiaries, Globalstar USA and Globalstar Caribbean, providers of Globalstar's satellite-based mobile communications in the United States and Caribbean, operate a satellite ground station, in Cabo Rojo, Puerto Rico. The facility improves access to satellite communications services throughout most of the Caribbean region. Globalstar USA subscribers can make calls throughout the Caribbean region without incurring international roaming charges. [Globalstar](#) (see separate report) value-added services include voicemail and data services.

10.4 MOBILE DATA SERVICES

Internet-based global remote access systems provider iPass offers global roaming services to mobile Internet subscribers through iPass in numerous Latin American countries, including two service providers in Puerto Rico. The network includes 1,100 access points in 150 countries.

Globalstar offers mobile data services on its satellite communications network. The service is the second satellite-based mobile data facility (after Inmarsat's), Globalstar Internet Access (GIA), operates in much the same way as a terrestrial mobile data service, allowing users to plug their notebook computer into the Globalstar GSP 1600 mobile, for mobile Web surfing.

AOL-LA in a joint venture with the Cineros Group has introduced Web access via wireless phones. The company has introduced the service in Brazil and commenced service in Puerto Rico in the first half of 2001.

The launch of 3G systems in Puerto Rico has opened the doors to faster communications services, including voice, fax and Internet, anytime and anywhere with seamless global roaming.

11. BROADCASTING MARKET

11.1 FREE-TO-AIR TV

The local television market includes five private VHF TV stations and several private UHF stations. These include the government-owned station via the Puerto Rico Public Broadcasting Corporation (Channel 6), a private university-owned cable station and a number of religious channels.

The commercial channels are:

- WKAQ-TV/Channel 2
- WAPA-TV/Channel 4
- WSTE-TV/Channel 7
- WLII-TV/Channel 11

These channels account for 86% of the audience, with the remaining 14% divided between the cable channels (9%) and WIPR-TV/Channel 6 (5%).

Until 2001 the market leader was Channel 2, part of the US network targeted to the Hispanic market. The other two major stations are Channel 4 and Channel 11, recently taken over by Univision, which became the market leader during 2002.

Virtually every household on the island is equipped with a TV. Roughly half of the TV programs are produced locally; the rest are imported from the US and Spanish-speaking countries. Most programs are transmitted in the Spanish language; programs from the US are usually dubbed in Spanish.

11.1.1 Puerto Rico Corporation for Public Broadcasting (CPRDP)

The CPRDP has two television stations – WIPR-TV and WIPM-TV. WIPR-TV went on air in 1958 becoming the first public education channel in Latin America. Channel 6 produces around 80% of the programs it broadcasts, the remainder coming from the affiliated Public Broadcasting Service. Despite receiving funding from the government and the Public Broadcasting Service, WIPR-TV obtains part of its income through advertising. This is, however, subject to FCC restrictions.

11.2 CABLE TV

Cable television is a fast growing alternative to local television and programs; around a third of the island's households subscribe to cable TV services, which are provided by 12 companies.

Geographically, Puerto Rico is situated in the footprints of satellites directed towards the USA, therefore it cannot receive the Spanish language satellite signals that are beamed towards Latin America. Consequently, Puerto Rican cable TV has mainly

English language channels that were originally intended for US audiences, such as the Discovery Channel, USA Network, ESPN etc, but not their Spanish language counterparts. Cabled households also receive the signals from US-based broadcast stations.

The main cable operators are:

- **Cable TV of Greater San Juan and Community Cablevision**, owned by Adelphia Communications Corp. They provide service to over 140,000 subscribers in Bayamon, Cataño, Carolina, Guaynabo, San Juan, Toa Alta, Toa Baja, and Trujillo Alto.
- **Liberty Cablevisión**, a subsidiary of Liberty Media Corp, has over 125,000 subscribers in 37 municipalities from the Central, East and North regions of the island. In the second quarter 2002, it launched the island's first full interactive TV service, as well as high-speed data access through cable modems. In December 2002 Liberty expanded its VoIP telephony service for its cable TV customers. Liberty's joint venture with service provider Net2Phone began in June. The company invested US\$45 million in 2002/2003, mainly to adapt its network for Internet access and telephony. A further US\$20 million is to be invested in 2004 to expand network coverage and add new services. Video-on-demand and home security services launch in April 2004.
- **Centennial Cable TV** (formerly Pegaso Cable TV) invested US\$15 million in 2002 to digitalize its system and offer more services and TV channels to its customers. Centennial also acquired TelePonce TV in 2001. The TelePonce systems serve areas in and around Ponce in the south-western part of Puerto Rico. TelePonce TV passes over 124,500 homes.
- **Digital TV One**, 100% digital video and audio over more than 60 channels.

11.3 SATELLITE TV

Both DirecTV and EchoStar have provided satellite TV service to Puerto Rico since 1998.

DirecTV is the leading provider of Direct Broadcast Satellite (DBS) service in the US with more than 11.5 million subscribers in the US and in Latin America. It offers digital programming, including local TV channels (in some markets), the major cable networks, original programming, and premium movie and pay-per-view channels. DirecTV's parent company, Hughes Electronics, is a unit of General Motors.

DirecTV Puerto Rico is owned by Darlene Investments, a joint venture comprised of the Cisneros Group of Companies and Bessemer Trust, and Hughes Electronics. DirecTV is the leading provider of DTH satellite television in Puerto Rico, Latin America and the rest of the Caribbean. It provides its local subscribers with local Channel 2 (WKAQ in San Juan) and local Channel 11 (WLII in Caguas).

Galaxy Latin America launched its DTH service in Puerto Rico. The Latin American DirecTV service is available in more than 25 countries, including Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Trinidad & Tobago and Venezuela. Various Caribbean island nations also get DirecTV from Galaxy.

The exclusive programming offer for DirecTV in Puerto Rico is the only one to be broadcast from two satellites launched to offer DirecTV to Latin America, Galaxy III-R (1995) and Galaxy VIII-I (1997). Subscribers are able to access more than 50 video channels, including 24 from the US, 30+ audio channels, pay-per-view options, complete sports packages and exclusive concerts and entertainment specials.

EchoStar Communications Corporation serves over 9 million satellite TV customers through its Dish Network. Dish Network delivers advanced digital satellite TV services, including hundreds of video and audio channels, Interactive TV, HDTV, sports and international programming.

For more information on EcoStar and DirecTV, see separate report: [USA - Broadcasting - Satellite TV](#).

12. RELATED REPORTS

For information relating to:

- Telecommunications in other Latin American markets, see: [Latin America](#);
- Worldwide activities in the telecommunications industry, see: [Global Overviews](#);
- Technical information relating to the telecommunications industry, see: [Technologies, Terminology and Glossary](#).

Copyright Paul Budde Communication Pty Ltd, 2004. All rights reserved.

This material is subject to the laws of copyright and is restricted to registered licence-holders who have entered into a Corporate, a Multi-User or a Single-User licence agreement with BuddeComm. It is an offence, punishable by AU\$250,000, for the licence-holder to make the material available to any unauthorised person, either via e-mail messaging or by placing it on a network. We offer very attractive multi-user and Intranet services. To arrange for additional user licences please contact us.

2643 George Downes Drive, BUCKETTY NSW 2250 AUSTRALIA
Telephone: +61 2 4998 8144 Fax: +61 2 4998 8247
E-mail: pbcbudde.com.au Web: www.budde.com.au